

the lever, the external air penetrates into the chest, the walls of which rise as in life. They return to their former position when the lever is raised, and these respiratory movements may be repeated fifteen to eighteen times a minute, as in a living man. By means of a tube communicating with a reservoir, and inserted in the windpipe, M. Woillez found that a litre of air, on an average, entered the air passages at each artificial inspiration, whereas the physiological average is only a demi-litre. Thus, more than a hundred litres of air can be passed through the lungs of an asphyxiated person in ten minutes. There is no danger of rupturing the lungs, however strongly the lever be wrought, for the force of penetration of the air is never superior to the weight of the atmosphere.

THE direction of plant-growth, it is known, is determined both by light and by gravity. The geotropism, or action of gravity exclusive of light has before been examined; and recently M. Müller (Thurgau), we learn from *Flora*, has endeavoured to study the converse fact of heliotropism, by excluding the influence of gravity as far as possible. He grew his plants in a cylinder rotating about its horizontal axis. The apparatus was so arranged that the light, coming through an aperture in the shutter of a dark room, fell parallel to the axis; the bendings observed were thus purely heliotropical. Among other results he found that only those zones which were not fully grown out, showed heliotropic bendings; that the most strongly growing parts of the stem were most sensitive to one-sided illumination; that the bending takes some (variable) time to manifest itself and continues some time after removal of the cause; that the rate of bending is at first slow, gradually increases to a maximum, and thereafter diminishes; that the bending is greater the intenser the light, &c.

IN the *Upsala Universitets Arsskrift* for 1874, Dr. Hamberg gives a most interesting paper, illustrated with eight coloured maps, on the night-frosts which have occurred in Sweden during 1871-72-73, from May 20 to September 30, or during that portion of the year of most interest to agriculturists. The observations of 285 Swedish observers are elaborately discussed, from which it appears that 80 per cent. of these frosts occur with northerly winds on the day preceding and on the days following them, but that during the night of the frost either the wind is very light or the air is calm. The map exhibiting the distribution of the spring frosts shows an abnormal excess on the south or lee side of the great lakes, arising, in all likelihood, from the low temperature of these lakes in spring. In autumn, on the other hand, when the temperature of the lakes is high, no such excess of frosts occur over the region south of them. One of the most striking results is the relatively small number of frosts over the district immediately to the north of Lake Wener, a result which may be due to the remarkable deflection of the wind in summer over this part of Scandinavia, so that winds are there south-westerly when they are north-westerly and westerly on the west of Norway. Six of the maps show well the intimate relation existing between the frosts and areas of high barometric pressure, and suggest that, if desired, the telegraph might be employed to give warning of these frosts, which are so destructive to vegetation.

THE *Supplemento alla Meteorologia Italiana* for 1875, fasc. iii., is entirely occupied with an exhaustive discussion of the temperature of Modena, by Prof. Ragona, director of the Royal Observatory there, based on the observations of the twelve years ending 1874. Among the more interesting points discussed with considerable fulness, are the anomalies of temperature which have occurred during the twelve years, particular attention being given to those anomalies which show a tendency to recur about the same dates from year to year. The prevailing

winds at Modena are west and south-west from November to February and north-east during the other months, and the changes of these winds is a point of the greatest importance in their relations to the anomalies of temperature which accompany them. Fasc. iv. contains an account by P. A. Serpieri, director of the Observatory of Urbino, of the earthquake which occurred in the night of March 17-18, 1875; and a notice, by Almerico da Schio, of the stations established, or in the course of being established, in the province of Vicenza, for meteorological observations, or for observations of rainfall, of weather, or of the depth of the rivers. Upwards of sixty such stations are indicated on the map of the province accompanying the paper.

Two important publications, constituting Nos. 5 and 6 of the *Bulletin* of the U.S. National Museum, by Mr. G. Brown Goode, Assistant Curator of that establishment, have lately been published by the Interior Department. The first, a catalogue of the fishes of the Bermudas in the collection of the museum, gives the first complete account of the ichthyology of that portion of the world. These were principally obtained by Mr. Goode during a visit to the islands in the months of February and March, and are notes on the character of the species, containing many important facts in regard to their natural history. Seventy-five species in all were actually obtained, and the existence of others determined, but not established by specimens. A chief value of the paper is in the description of the colours of the fish while living, and the notes on their size and hints on their popular names, their capture, and economical value. The second publication was prepared by Mr. Goode as a classification of the collections made by the Smithsonian Institution and the United States Fish Commission for the Centennial Exhibition at Philadelphia.

THE additions to the Zoological Society's Gardens during the past week include two Royal Pythons (*Python regius*) from West Africa, presented by Mr. J. J. Kendall; a Greater Sulphur Crested Cockatoo (*Cacatua galerita*) from Australia, presented by Mrs. Baliol Scott; two Striped Hyenas (*Hyæna striata*), an Alligator (*Alligator mississippiensis*) from North America; two American White Cranes (*Grus americana*) from North America; a Green-winged Trumpeter (*Psophia viridis*) from Brazil, purchased; three Shoveler Ducks (*Spatula clypeata*) hatched in the Gardens.

### SCIENTIFIC SERIALS

*Journal of the Chemical Society*, April.—A paper on oxynarcone, a new opium educt, and its relationships to narcotine and narceine, is contributed by Dr. Wright and Mr. G. H. Beckett. This new body is obtained from an indistinctly crystalline mass, which, during the preparation and purification of narceine from opium liquors, is often left undissolved on boiling the partially purified narceine with water. This crude product contains the new opium alkaloid, bearing to narcotine the relationship of benzoic acid to benzoic aldehyde.—Dr. H. E. Armstrong and Mr. George Harrow contribute two papers: one on the action of potassic sulphite on the haloïd derivatives of phenol, the other on the action of nitric acid on tribromophenol. The length of the chemical names made use of in these papers is positively alarming, e.g., dichlorophenolorthosulphonate and diorthobromoparanitrophenol.—Mr. Cornelius O'Sullivan contributes a paper on maltose, which is intended to show that maltose, obtained by the action of malt-extract on starch, is a simple body, isomeric with cane-sugar, and not a mixture of dextrin with dextrose, as M. Bondonneau, in a note recently presented to the Academy, regards it.—Mr. M. M. Pattison Muir, F.R.S.E., gives a method of estimating bismuth volumetrically. Potassium chromate or potassium dichromate solution is run into a nearly neutral solution of bismuth nitrate until the whole of the metal is precipitated in the form of chromate. The final point of the reaction is determined by the formation of red silver chromate, when a drop of

silver nitrate is brought into contact with a drop of the supernatant yellow liquid.—Mr. Thomas Fletcher gives a brief note on a simple form of gas regulator, differing only in form from one described by Mr. Page in the January number of the *Chem. Journ.* for 1876.—Mr. Thomas Carnelley, B.Sc., F.C.S., contributes a paper on high melting-points, with special reference to those of metallic salts. The author describes a new method which he proposes for determination of high melting-points, and the results of his investigations by this new method. The principle of this new method is as follows:—In a platinum crucible a small quantity of a salt is placed, and the crucible suspended in the flame of a Bunsen's burner or of a blowpipe. If the temperature at which the salt fuses is not above a certain point, the temperature of the crucible after a time reaches that point. If, at the instant the salt is seen to melt, the crucible be dropped into a known weight of water of known temperature, and the rise in temperature noted, from the equation for specific heats, we obtain the initial temperature of the crucible at the time the salt melted, and hence the temperature at which the fusion occurred, assuming that the mean temperature of the crucible is the same as that of the salt at the moment of melting.—Numerous abstracts of papers published in other journals, together with a full account of the anniversary meeting of the Chemical Society, complete the contents of this number.

*American Journal of Science and Arts*, June.—We have here some interesting observations on Saturn, made by Mr. Trouvelot during the last four years with the refractors at Harvard, Washington, and Cambridge Observatories. He notes, *inter alia*, some singular dark angular forms on the inner margin of the first ring, outside the principal division of the rings; it seems due to a jagged conformation. The three outer rings have shown a mottled or cloudy appearance on the ansæ; the cloud-forms at some parts attain different heights, and change their relative positions. The dusky ring is not transparent throughout, as has been supposed; and it grows more dense as it recedes from the planet, so that, at about the middle, the limb of the planet ceases entirely to be seen through it; further, the matter of this ring is agglomerated here and there into small masses.—The "1474" line, which is reversed in the spectrum of the solar corona, coincides with one of the short lines in the spectrum of iron. It appears in ordinary spectroscopes like a fine hard black line; but in lately examining this part of the spectrum with a diffraction spectroscope armed with a silver glass "gitter platte" of 8640 lines to the inch, Prof. Young found the line to be unmistakably double. The more refrangible line he regards as the real corona line; the other belonging to the spectrum of iron.—Mr. J. Lawrence Smith, in a paper on carbon compounds in meteorites (here concluded) arrives at some important results. The phenomena of the graphite nodules are very puzzling; the presence of such substances as free sulphur, and a hydrocarbon in the interior of the graphitic concretions was certainly not to be expected. We now know of celestial carbon (Mr. Smith says) in three conditions, viz., in the gaseous form as detected by the spectroscope in the attenuated matter of comets; in meteorites in the *solid* form, impalpable and diffused through pulverulent masses of mineral matter; also in the *solid form, but compact and hard*, like terrestrial graphite, and imbedded in metallic matter, that comes from regions in space.—From experiments on the diminution of the minute distance between two surfaces in contact, with the increase of the contact pressure (the substances being iron, brass, and plate glass), Prof. Norton found that the diminutions were very nearly the same, whatever the nature or condition of the surfaces in contact; that they were nearly independent of the extent of the surface in contact; and that the diminution of contact-distance for an increase of one ounce in the pressure, was nearly inversely proportional to the pressure.—Mr. Carey Lea describes experiments on the sensitiveness of silver bromide to the green rays as modified by the presence of other substances. Finding no red substance capable as such of increasing this sensitiveness, and on the other hand, many colourless substances which have that effect, he is confirmed in the opinion that there is no relation between the colour of a substance and that of the rays to which it increases the sensitiveness of silver bromide.—We further note a translation of M. Hartt's first report on the geological survey of Brazil, a paper by Mr. King on palæozoic divisions on the fortieth parallel, and an account of a nebula photometer, by Mr. Pickering.—Prof. Marsh describes some new fossil birds.

*Archives des Sciences Physiques et Naturelles*, Feb. 15.—From researches on the specific heats of saline solutions, described in

this number, M. Marignac concludes that the specific heat depends not solely on the nature of the acids and bases of the salts; so that one cannot calculate it from their composition. It may be modified by other causes special to each salt, and the nature of which is still unknown. These causes do not seem to be connected with the greater or less tendency of salts to combine with water and form definite crystallisable hydrates.—It is a disputed point among physiologists whether fat is a product of decomposition of albumen. M. Secretan here describes an investigation on the subject. His experiments were on albumen decomposed in current water, and in the ground. He considers that the transformation in question is improbable, and accepts Orfila's theory, that the fat of dead bodies is only formed where there is already fat present, and an azotised matter.—In a paper on the constituents of woman's milk and cow's milk, M. Lachenal finds that the latter is richer in nitrogen, and consequently in albumenoid substances than the former, in the proportion of 3.51 to 2.53. After coagulation, the serum of cow's milk no longer contains either casein or albumen, whereas the serum of woman's milk holds in solution a quantity of albumenoid matters which may be estimated at a half of the nitrogenised substances of the milk.—M. Gillieron studies the traces of ancient glaciers of the valley of the Wiese in the Black Forest.—In a reply to M. Soret, on the temperature of the sun, M. Violle describes some interesting observations on the radiation from incandescent steel.

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, May 18.—"Note on a Simultaneous Disturbance of the Barometer and of the Magnetic Needle," by the Rev. S. J. Perry, F.R.S.

Linnean Society, June 15.—Prof. Allman, president, in the chair.—Prof. Rolleston read an interesting paper on the prehistoric pig of Britain, illustrating this by a series of skulls of species, wild and tame.—Dr. Masters followed by remarks on the superposed arrangement of the parts of the flower. The alternate arrangement in the parts is so general that exceptions are invested with peculiar interest. "Alternate" and "superposed" the author used in preference to the term "opposite," and he stated superposition exists in a large number of very diverse families. He then gave instances of apparent or false superposition in certain of the cultivated varieties of *Camellia*, &c. Real superposition may arise from (1) superposition of whorls, exemplified in the monstrous *Daffodil* (*Narcissus Eystettensis*); (2) spiral arrangement of parts, e.g. *Sabia*; (3) enation, choris, between which it seems necessary to draw a distinction, although the differences in the adult flower may not be always obvious (in choris the original organ is repeated, in enation the process is subsequent to the first stages of development, example scales before the petal in *Silene*); (4) abortion or suppression of intermediate whorls, e.g. *Vine*, &c.; (5) pleiomery, when numbers of successive whorls are unequal, some of the additional parts become superposed *Nigella* cited; (6) substitution of one organ for another, in *Zanthoxylum*; (7) torsion of the axis, either between two successive whorls or of constituent elements of whorl, exemplified in leaves rather than flower.—Dr. Masters then drew attention to illustrations of the relative position of the perianth and androecium in genera of the *Tiliaceæ* and *Oleaceæ*.—A paper by Dr. J. Anderson on the skeleton and feathering of the spoon-billed sandpiper (*Eurynorhynchus pygmaeus*) was read, and Mr. E. Harting in exhibiting skins of this rare Indian bird and its allies, made remarks thereon. Dr. Anderson shows that, excepting deviation in the bill, *E. pygmaeus* in detail agrees with the genus *Tringa*.—Mr. W. Archer gave a summary of a paper of his on the histology and development of the genus *Ballia*. The material for research was furnished partly by the *Challenger* and partly by the Transit of Venus expeditions, and obtained in Kerguelen's Land. The author found that the septa separating contiguous cells contained circular "pits" which were closed by plano-convex "stoppers," the purpose of which is difficult to determine. The pits do not communicate and the pair of stoppers, easily disturbed from their positions, resemble a rivet passing through the septum. He further described the peculiar manner in which the cells of the rachis are jointed together, the mode of development of the branches, the origin of the cortical investment of confervoid filaments, and tantamount modifications in nearly-allied species.—A second communication of Mr. Archer's was on fresh-water algae collected